

Benvenuto Cellini was attracted to Paris from Florence in consequence of the much clearer and more beautiful atmosphere in the capital of France than in Italy! This fact is derived from the artist's autobiography. What a change now! Paris is rapidly becoming as bad as London.

W. H. PREECE

February 5

IN NATURE, vol. xxiii. p. 195, I found an interesting abstract of a paper read to the Royal Society of Edinburgh, December 20, by Mr. John Aitken, showing "that dust is the germ of which fogs and clouds are the developed phenomena." It is not in the least the intention of this letter to diminish the value of the above-mentioned paper and experiments, but I wished to say that already, several years past, the same results were obtained by Messrs. Coulier and Mascart (1875) in France (*Naturforscher*, 1875, p. 400; *Journal de Pharmacie et de Chimie*, série 4, xxii. p. 165).

In my "Théorie cosmique de l'Aurore Polaire," p. 36, I have already pointed out the great importance of these results on the relation between aurorae and clouds and the danger of measuring the height of auroral displays by means of superior cloudy apparitions (p. 35). In fact, if the invisible aqueous vapour is able to reach much higher regions than terrestrial dust, and if aurorae are in close connection with cosmical matter in a state of extreme division, like our theory attempts to prove, this cosmical matter is without any doubt enabled to form aqueous clouds in a much higher than the usual level. Moreover we have already, in 1873, in the German journal *Gaea* (Köln und Leipzig, E. H. Mayer), asked: "Welches wohl die weitere Rolle der Eisen- und anderen Dämpfe sei, welche nach der Verbrennung in den oberen Regionen der Atmosphäre schwebend bleiben und offenbar nach vollständiger Abkühlung einen Niederschlag von fein vertheiltem Eisenoxyd und anderen Stoffen bilden. Sollten diese Theilchen . . . keine Veranlassung geben können zu den von deutschen Beobachtern so oft wahrgenommenen 'Polarbändern,'¹ deren Zusammenhang mit dem Nordlicht schon öfters dargethan ward, aber bisher unerklärt blieb. Noch würden wir hinzufügen können, mit Hinweis auf die Beobachtung Secchi's eines angeblichen Nordlichts bei Tage (NATURE, October 17, 1872), dass auch die bis jetzt ganz unerklärte, eignethümliche Gestalt der Cirri, mit ihren ganz regelmässigen, auf ein gewisse Gesetz hindeutenden transversalen Verzweigungen, von der Anwesenheit feiner Eisenstaubkerne in den Eisnadeln möglicherweise bedingt ist. Bekanntlich schweben diese Cirri in den höchsten Wolkengrenzen."

It will further be generally known that microscopic meteorites have been found in the centre of hailstones (*Comptes rendus*, 1872, p. 683).

H. J. H. GRONEMAN

Groningen (Netherlands), January, 1881

New Cases of Dimorphism of Flowers—Errors Corrected

REVIEWING my notes and drawings of some years ago, I find the following new cases of dimorphism of flowers:—

1. *Syringa persica*, L., cultivated in the garden of the Lippstädter Realschule, is gynomonoecious. In the same inflorescence there are found a majority of hermaphrodite flowers of larger size and a minority of female flowers of smaller size. The hermaphrodite flowers are homogamous and short-styled, like *Syringa vulgaris*, L. (H. Müller, "Die Befruchtung der Blumen," p. 340, Fig. 125). The anthers of the female flowers, which are much reduced in size and never contain any pollen, are inserted sometimes above, sometimes beneath, but commonly in the same height with the stigma. In some few of the small-sized flowers the number of the petals is reduced to three.

2. *Stellaria glauca*, L., near Lippstadt, is gynodioecious, like *St. graminea*, L., as described by F. Ludwig (*Bot. Centralblatt*, No. vi. p. 28), some stems bearing small-sized flowers with very reduced anthers of white colour and greatly-developed stigmas, a vast majority of other stems bearing larger-sized proterandrous flowers with anthers of red colour.

3. *Sherardia arvensis*, L., near Lippstadt, is likewise gynodioecious, its hermaphrodite flowers being proterandrous and larger-sized, with a corolla of 3½-4 mm. diameter, its female

¹ Or "Polarbanden." My daily observations of these phenomena, beginning with the year 1875, are to be found in the German journal *Wochenschrift*, editor, Dr. Hermann J. Klein in Köln.

flowers possessing a corolla of only 2½-3 mm. diameter, with extremely reduced anthers.

4. *Asperula tinctoria*, L., produces in Thuringia so frequently flowers with only three petals that in those stems examined by myself by far the greatest part of the flowers were three-petaled.

In my book "Alpenblumen" Dr. Focke of Bremen has detected two errors of naming, which immediately ought to be corrected: the flower described and illustrated on p. 171 is not *Empetrum nigrum*, but *Azalea procumbens*, like that of p. 377; *Cerinthe*, in pp. 264, 265, is not *major*, L., but *glabra*, Mill = *alpina*, Kit.

HERMANN MÜLLER

Lippstadt

Geological Climates

I HAVE read with much interest and attention the letters that have appeared in recent numbers of NATURE on the subject of "geological climates," and although it must appear presumptuous on my part to do so, I shall endeavour to show that each of the distinguished writers of these letters may be somewhat in error on at least one point, which—if I am right—must materially affect the correctness of the conclusions they have come to.

I think that Mr. Wallace, whilst very justly giving the Gulf Stream and other currents which *might* exist were certain lands submerged, credit for great influence in ameliorating the rigour of climate, does not take into sufficient consideration the fact that the waters of the Gulf Stream, although warmer, are, in consequence of holding much more salt in solution, heavier than the colder and less saline Arctic current.

Some experiments show, as clearly as anything done on a very small scale can, that two waters brought as nearly as possible to the conditions of the Gulf Stream and the Arctic current do not mingle when simultaneously poured into a long narrow glass trough; the Arctic water invariably taking its place on the surface.

Supposing then that these two currents meet somewhere about latitude 80° or 81° N., the Arctic water flowing south—if my experiments are of any value—will retain its position on the surface and the warm current pass underneath, and thus lose all its heating influence on the air over a Polar area about 1000 geographical miles or more in diameter.

We can have no stronger example of this effect of difference of density of ocean water than is shown by the two currents *in and out* of the Mediterranean Sea.

In NATURE, vol. xxiii. p. 242, Prof. Haughton says, "The thickness of this ideal ice-cap at the Pole is unknown, but from what we know of the Palæocystic ice of Banks Land and Grinnel Land must be measured by hundreds of feet, and its mean temperature must be at least 20° F. below the freezing-point of water."

With regard to both the above assumptions—which are in italics—I must beg to disagree entirely with the learned Professor. He appears to consider the so-called Palæocystic ice as the normal state of the ice at and near the Pole, and as a natural growth by the gradual freezings or increase of a single floe during a series of years; whereas I am of opinion that this mis-called Palæocystic ice is the result of a number of floes being forced over and under each other by immense pressure caused by gales of wind and currents.

The western and northern shores of Banks and Grinnel Lands are peculiarly well suited for the formation of such ice-heaps, as they are exposed to the full force of the prevailing north and north-west storms, which pile up the ice in a wonderful manner on these shores and others similarly placed, for a distance of miles seaward. The whole of the west shore of Melville Peninsula is so lined with rough ice of this kind that sledging is impossible.

It will wholly depend upon the form of land—if any—at or near the Pole, whether or not any floebergs are there. If there is no land it is probable there will be few or none, as the ice will meet with no great obstruction, as it is driven by winds and currents.

I have no authorities by me that give the thickness of ice formed in one season at or near the winter quarters of any of the Arctic expeditions, except my own in 1853-4 at Repulse Bay, latitude 66° 32' north.

The measurements of the ice—taken at some distance out in the bay where there was very little snow—and the mean temperature of the air are given on next page.

1853	Ice thickness	Increase	Monthly Mean Temp. F.
December 20	4 feet 7 inches ...	—	-24° 5 below zero
1854			
January 24	5 feet 9 inches ... 14 in 35 days	—	-30° 6 "
February 25	7 feet 3 inches ... 16 in 32 days	—	-34° 9 "
April 25 ¹	8 feet 15 inches ... 12 in 59 days	—	-8° 5 "
May 25	8 feet 14 inches ... none 30 days	—	+24° above zero

The above table shows that the ice ceased to increase in thickness some time between April 25 and May 25, after which it decreased rapidly; but I was unable to decide what proportion of this decrease was due to thaw and evaporation from the surface, and what amount from the lower part of the floe that was under water: no doubt by far the greater effect was produced by the two first causes.

Eight feet may perhaps be considered a fair or rather a high average of one winter's formation of new ice (not increase of an old floe) over the whole of the Arctic Sea, because Repulse Bay, although in a comparatively low latitude, was particularly favourable for ice-formation, there being no currents of any consequence. Where there are currents, one year's ice does not exceed three or four feet.

The winter's ice of 1875-6 at Discovery Bay, in latitude 81° 40' N., did not exceed, if I remember correctly, six feet in thickness.

Even were these great compound floes, called Palaeocrystic ice, found at or near the Pole, and of only the same thickness as those seen at Grinnell Land—instead of "hundreds of feet"—they would not probably have nearly so low an average temperature all the year round as 20° F. below the freezing-point of water, because only one-sixth of their mass would be exposed to very low temperatures for about six months of the year, the surface being during that time protected by a more or less thick covering of snow, whilst at least five-sixths of their bulk was under water, having a temperature for the whole twelve months at or above the freezing-point of the sea. The question is, how far the very low temperatures of an Arctic winter do penetrate a mass of, say sixty feet of ice, the surface of which is covered with a foot of snow, and fifty feet or five-sixths under water of a temperature at or above the freezing-point of the sea?

From my experience on a much smaller scale, I do not believe that the atmospheric cold would, under the circumstances mentioned, penetrate to the lower surface of ice sixty feet thick; and if it does not do so there would be no increase to its thickness during winter.²

An excellent example of formation of Palaeocrystic ice, or floe-berg is afforded by the experience of the Austro-Hungarian Expedition under Weyprecht and Payer in the Barentz Sea in 1873-4. Their ship was lifted high out of the water by the pressure of the floes, which were forced over and under each other to a great thickness and extent in a very few days.

The ship and her crew were helplessly drifted about for many months, during which the floes were frozen together into one solid mass, and the inequalities of the surface in a great measure filled up with snow-drift.

JOHN RAE

4, Addison Gardens, January 29

On the Spectrum of Carbon

IN addressing to you my former letter regarding Dr. Watts's experiments on the spectrum of carbon, it was not my intention to enter on any discussion concerning matters of opinion. The reference made in that letter to the difficulty of perfectly drying a gas so as to eliminate the ultra-violet spectrum of water had reference to gases at ordinary atmospheric pressure; and the expectation a gas will be dried "to all intents and purposes" by the use of a U-tube of phosphoric anhydride goes far to explain the origin of different experimental results. The cogent experimental evidence which Dr. Watts justly demands may, so far as the relations of carbon and nitrogen are concerned, be found in our complete papers on the spectrum of carbon compounds in the *Proceedings of the Royal Society*.

The supposition, which appears to be a difficulty to Dr. Watts's mind, that traces of nitrogen in hydrocarbons give with the spark the spectrum of nitrocarbons, and that traces of hydrogen in cyanogen give the hydrocarbon spectrum, is not only "reasonable,"

¹ The mean temperature opposite to April is that of March and April combined, and it will be seen that the average increase of ice for each of these months is only 6 1/2 inches.

² That the sea raises the temperature of the ice on its surface even in very cold weather, is evinced by the fact that a snow hut built on the ice is warmer than if built on the land.

but appears to me most consistent with the spectrum observations on the whole, and with the chemical regarding the formation and relations of acetylene and hydrocyanic acid.

Cambridge, January 22

G. D. LIVEING

Vibration of Telegraph Wires During Frost

MR. T. M. READE asks for an explanation of this phenomenon. In *Science Gossip* for 1874, p. 254, there is a short article of mine on "Frost Phenomena," and one of those referred to is this curious vibration of telegraph wires.

The explanation there suggested, which was only a guess, is probably incorrect; but I think I can give the true one now, and it is, as usual in such cases, extremely simple.

Hoar frost is only deposited in air which is nearly at rest; a strong wind shakes it down as it forms. But there is nearly always a slight air-current in one definite direction, and the ice spicules are built up "in the teeth" of this current, that is on the windward side of the wire or twig.

They always point towards the wind. When they have attained a length of, say, half an inch, if the direction of the air-current slightly changes, it may strike the comb-like fringe no longer on the points, but on the side, and, obtaining thus a leverage upon the wire, will twist it round till the pressure is balanced by the torsion. If the pressure were absolutely constant the wire would perhaps remain in this position, but the very slightest variation of pressure would set up a vibratory motion, and this, I think, must be the true cause of the phenomenon.

Birstal Hill, Leicester, February 5

F. T. MOTT

The Star Oeltzen, 17681

THE star Oeltzen, 17681, whose spectrum was announced by me to consist mainly of a yellow and blue band (NATURE, vol. xxii, p. 483), proves to belong to the same class as the three stars in Cygnus discovered by Wolf and Rayet in 1867 (*Comptes rendus*, vol. lxv. p. 292). A curious feature of these spectra is that they resemble each other without being identical, the relative brightness of the lines being very different. A further study of them is much to be desired.

Cambridge, U.S., January 24 EDWARD C. PICKERING

Zeuglodontia

IN consequence of my letter in NATURE, vol. xxiii. p. 54, the sub-editor of the *Graphic* was kind enough to send me the number of that paper containing the engraving of the animal seen from the *City of Baltimore* (not *City of Washington*, as I had misunderstood), and which is that of April 19, 1879. The sketch from which this was taken was sent by Major H. W. J. Senior of the Bengal Staff Corps, with the following description, viz. :-

"On January 28, 1879, at about 10 a.m., I was on the poop deck of the steamship *City of Baltimore*, in lat. 12° 28' N. long. 43° 52' E. I observed a long black object abeam of the ship's stern on the starboard side, at a distance of about three-quarters of a mile, darting rapidly out of the water and splashing in again with a sound distinctly audible, and advancing nearer and nearer at a rapid pace. In a minute it had advanced to within half a mile, and was distinctly recognisable as the veritable 'sea-serpent.' I shouted out 'Sea-serpent! sea-serpent! call the captain!' Dr. C. Hall, the ship's surgeon, who was reading on deck, jumped up in time to see the monster, as did also Miss Greenfield, one of the passengers on board. By this time it was only about 500 yards off, and a little in the rear, owing to the vessel then steaming at the rate of about ten knots an hour in a westerly direction. On approaching the wake of the ship the serpent turned its course a little away, and was soon lost to view in the blaze of sunlight reflected on the waves of the sea. So rapid were its movements that when it approached the ship's wake I seized a telescope, but could not catch a view, as it darted rapidly out of the field of the glass before I could see it. I was thus prevented from ascertaining whether it had scales or not, but the best view of the monster obtainable when it was about three cables' length, that is about 500 yards distant, seemed to show that it was without scales. I cannot, however, speak with certainty. The head and neck, about two feet in diameter, rose out of the water to the height of about twenty or thirty feet, and the monster opened its jaws wide as it rose, and closed them again as it lowered its head and darted forward for a dive,